

# **THE NATIONAL POLAR-ORBITING OPERATIONAL ENVIRONMENTAL SATELLITE SYSTEM (NPOESS) and NPOESS PREPARATORY PROJECT (NPP) ACCESS to DATA**

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## **ABSTRACT**

During the last decade, the two U.S. civilian and military systems, POES and DMSP, have evolved to use a somewhat similar spacecraft bus, but have different instrument suites. Many government studies had been conducted to assess the value of converging the two systems into a single system. Most studies recommended retaining the separate systems. A 1993 tri-agency study by DoD, NOAA, and NASA recommended that a single converged system should replace the current separate systems.

A Presidential Decision Directive (PDD), signed in May of 1994, directed the convergence of the polar orbiting weather satellites systems into a single national system. The Integrated Program Office (IPO) within NOAA was established in October 1994 as a result of the signing of a tri-agency Memorandum of Agreement (MOA) in May 1994. The new converged system was identified as the National Polar-orbiting Operational Environmental Satellite System (NPOESS). The IPO is staffed with representatives of NOAA, Department of Defense and NASA. This unique tri-agency office has the mission to provide a converged polar-orbiting operational, environmental satellite system that meets user community requirements. Accessibility to data is a key feature of the NPOESS mission.

The NPP is a joint-agency mission intending to serve the National Polar-orbiting Operational Environmental Satellite System (NPOESS) Integrated Program Office (IPO) and the National Aeronautics and Space Administration (NASA) and their user communities. The NPP provides the Earth science community with data continuity and also provides the IPO and its users a risk reduction demonstration of capabilities for critical NPOESS instruments. Current NPP status and the NPP architecture will be discussed as part of this presentation.

All NPOESS satellites will operate at a nominal 833 km altitude orbit with an inclination of 98.7 degrees (sun-synchronous) and have nodal crossing times to minimize critical revisit times. NPP will operate at a nominal 824 km altitude orbit at a 1030 descending node time. NPP and NPOESS have undertaken a far-reaching program of sensor development and satellite transition to provide complete coverage of meteorological conditions for civil, military, and scientific purposes while cutting operational costs dramatically. The program will adapt existing technology and develop new sensors.

To accomplish its mission, NPOESS satellites in three orbital planes will replace the two-satellite DMSP and POES constellations. The data will be processed into Raw Data Records (RDRs), Sensor Data Records (SDRs), and Environmental Data Records (EDRs) for use by a number of operational communities.

NPOESS delivers data to a variety of users. National and international weather, climate, hydrological, and space weather analysis and prediction centers serve the needs of billions of people worldwide. International services such as Search and Rescue Satellite-Aided Tracking (SARSAT) and ARGOS are part of the NPOESS mission.

NPOESS will provide regional data to all users in two direct broadcasts, global data within 90 minutes of observation to US Weather Centers, and global data to NOAA NESDIS's Archive System for worldwide subscription service. High Rate Data (HRD) will be broadcast using CCSDS packets at 20 Mbps at 7812 MHz or 7830 MHz. HRD will contain full resolution imagery and radiometric from all NPOESS environmental sensors. Low Rate Data (LRD) will be broadcast using CCSDS packets at ~3.5 to 4.0 Mbps at 1702 MHz - 1710 MHz (To Be Resolved). LRD will contain information to produce imagery, cloud base height, and Sea Surface Temperature.

Stored Mission Data (SMD) will be transmitted to strategically placed receiving antennas necessary to achieve a 90 minute data latency. SMD data will be transmitted using CCSDS packets at 8212.5 MHz, or 13775 MHz, or 26250.0 MHz (To Be Resolved). International users will have access to SMD via the NOAA NESDIS Archive.

Software to produce NPOESS EDRs will be made available to users through commercial vendors by the NPOESS Integrated Program Office. NPOESS will provide a continuing improvement in the accuracy of weather and climate forecasts for many years to come.

The paper will discuss the NPP and NPOESS SMD, HRD & LRD concept of operations, ground system requirements and development status. The paper will also discuss user involvement in the design and fielding of NPP and NPOESS.